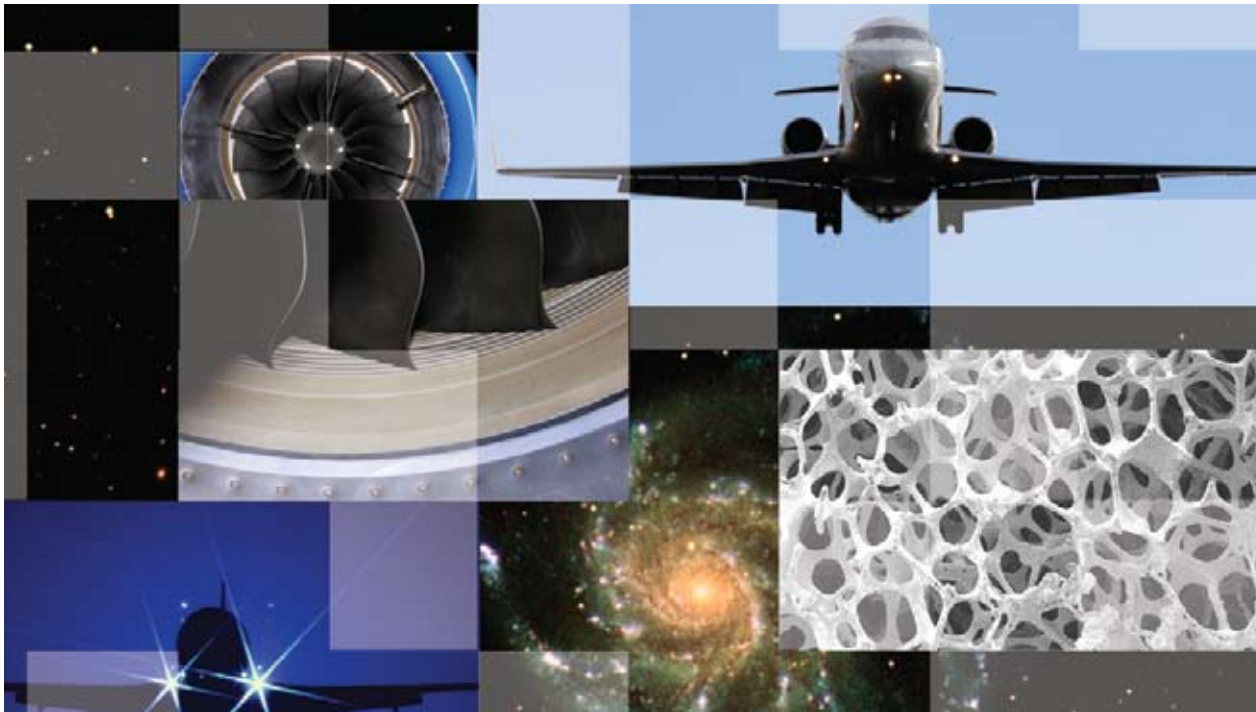


Technology shows promise of 4 dB noise reduction.



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- Williams International wished to evaluate noise reduction concepts to continuously improve cabin noise quality. In providing an engine for the tests, Williams could assess the acoustic benefits of the patent-pending over-the-rotor metallic foam liner as a solution.
- Testing the liner on a production engine guided NASA in developing system-level prediction tools for aircraft engine noise and performance.
- The tests advanced NASA's Subsonic Fixed Wing project in its quest to reduce noise of subsonic aircraft. Test results showed a potential 4 dB reduction in engine noise.
- Demonstrating the feasibility of the over-the-rotor metallic foam liner in small aircraft engines reduces risks to using the technology in large commercial aircraft engines.
- With the test data, NASA may be able to market the method for other applications, such as HVAC systems and space propulsion.

Scopus

On the Record

"I find the Seed Fund partnership a very useful way to work together on some very innovative projects."
— *Fayette Collier, Subsonic Fixed Wing project's Principal Investigator, NASA's Langley Research Center*

"Industry is looking for results. The IPP Seed Fund program helps us cement partnerships with industry more quickly." — *Edmane Envia, Subsonic Fixed Wing project's Associate Principal Investigator for acoustics discipline, NASA's Glenn Research Center*

"We're using the relationships developed through the Seed Fund partnership to explore a completely new collaboration in core noise." — *Daniel Sutliff, aerospace engineer, NASA's Glenn Research Center*

About Williams International

Williams International, headquartered in Walled Lake, Michigan, and with a production facility in Ogden, Utah, develops and produces small gas turbine engines. Founded in the early 1950s, the company has introduced products and services that have changed the aerospace industry. Its miniature turbofans have enabled the creation of cruise missiles, the X-Jet flying platform, and very light business jets. It recently won *Professional Pilot* magazine's Powerplant Product Support Survey for the 11th consecutive year.

Technology Origins

Reducing aircraft engine noise is crucial to meeting the ever more stringent restrictions in the United States and Europe on aviation noise. As of 2006, communities nationwide had spent over \$4.5 billion to ease the effects of airport noise through residential noise-insulation programs and land acquisitions. NASA's Subsonic Fixed Wing project aims to develop technologies for reducing noise for subsonic aircraft. Engineers at NASA's Glenn and Langley Research Centers have been researching the use of metallic foam liners installed in close proximity to the rotor, with the goal of significantly reducing aircraft engine noise. The patent-pending over-the-rotor metal foam liner could potentially reduce engine fan noise by 4 dB, thus contributing to quieter aircraft engines, which would mitigate the requirements for residential noise-insulation programs.

Technology Improvement Through Collaboration

Just as NASA was concerned about reducing aircraft engine noise, Williams International, a manufacturer of small gas turbine engines for business jets, similarly wanted to reduce engine noise without adding to the size or weight of its aircraft. Williams not only contributed the

FJ44 engine and test stand, but the company's expertise in nacelle design as well. Testing was conducted at NASA's Aeroacoustic Propulsion Laboratory (AAPL).

The Transfer/Partnership Process

Representatives from Williams International attended the April 2007 NASA Acoustics Technical Working Group (TWG) meeting. They had seen the results of metallic foam liner efficacy in low-speed fan tests conducted at NASA's AAPL presented earlier. The Williams' representatives contacted one of the inventors of the over-the-rotor acoustic liner method, while at the TWG, to discuss the benefits of partnership.

The Seed Fund provided the opportunity for NASA's and Williams' engineers to move forward quickly with the test phase. NASA transferred the knowledge on the patent-pending over-the-rotor liner design, as well as acquisition and processing of the acoustic data. In return, Williams built the liner and provided the engine testbed. The test also provided an opportunity for NASA engineers to reacquaint themselves with engine testing.

Looking Ahead

NASA wants to apply the lessons learned from the collaboration project to further improve the technology. NASA also plans to build on the partnership experience to find noise-abatement solutions for large engines more prevalent in commercial aircraft fleets.

For More Information

If you would like additional information about Glenn's technology transfer opportunities, please contact:

Technology Transfer and Partnership Office
NASA's Glenn Research Center
Phone: 216-433-3484
E-mail: TTP@grc.nasa.gov